



CASE REPORT

Neotendon infilling of a full thickness rotator cuff foot print tear following ultrasound guided liquid platelet rich plasma injection and percutaneous tenotomy: favourable outcome up to one year [v1; ref status: indexed, <http://f1000r.es/xz>]

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Abstract

This is a case report on excellent clinical outcome and neotendon infilling at one year follow up in a degenerative rotator cuff full thickness tear following percutaneous tenotomy and platelet rich plasma injection.

Article Status Summary**Referee Responses**

Referees	1	2	3
v1 published 24 Jan 2013	 report	 report	 report

- 1 Elizaveta Kon**, Rizzoli Orthopaedic Institute Italy
- 2 Nicola Maffulli**, Keele University UK
- 3 Marco Patrino**, University of Padova Italy

Latest Comments

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Introduction

Rotator cuff tears are an increasingly common cause of morbidity in the aging population. There are surgical and non surgical management options including open or arthroscopic procedures, percutaneous corticosteroid injections, physiotherapy for rotator cuff tears. It is well accepted that there is a poor outcome in degenerative rotator cuff tears after surgery¹. This report is based on the clinical and imaging outcome in a patient who received platelet rich plasma (PRP) and percutaneous tenotomy treatment for a full thickness supraspinatus tear.

Case report

A 73 year old right hand dominant active lady complained of bilateral shoulder pain for about two months and did not respond to two ultrasound guided subacromial subdeltoid corticosteroid injections. Her shoulder injury occurred whilst she had been caring for her husband and working on their farm. In the past she had recovered from non-Hodgkin's lymphoma and currently was on antihypertensive medication (candesartan cilexetil once a day). She had led a physically active country life style prior to the presentation of the problem and had never smoked in her life.

At presentation there was painful limitation of right sided shoulder abduction to less than 90 degrees. Ultrasound documented a 9mm x 14mm partial width full thickness footprint tear of the anterior to mid right supraspinatus with tendinosis of most of the tendon and enthesopathy at the greater tuberosity of the humeral head (Figure 1). A plain radiograph of the right shoulder showed a down-sloping Type 2 acromion. There was mild wasting of the right supraspinatus muscle. A diagnosis of a recent footprint tear superimposed on degenerative supraspinatus tendon with mild muscle atrophy was

made. Following written informed consent from the patient, 8ml of autologous unclotted blood was venesected and centrifuged for 5 minutes at about 3000 rotations per minute in a special tube for PRP preparation (BCT, REGEN Labs, Switzerland). 4 to 5ml of liquid PRP was injected through a 22g 5cm long needle into the tear and its margins with simultaneous percutaneous tenotomy directed into the footprint of the anterior facet of the greater tuberosity under direct ultrasound imaging control (GE Logic 9, 9MHz probe). 5ml 1% lignocaine was injected into the superficial soft tissues, subacromial bursa and the supraspinatus tear for local anaesthetic purposes. The shoulder was placed in a sling with 90 degree elbow flexion for 7 days. Physiotherapy was commenced at 4 to 5 weeks post PRP with a home exercise program. At 8 weeks follow up post PRP the patient verbally reported a marked reduction in pain with improvement in shoulder movement. At the 7 and 10 month follow up there was complete relief from pain with full range of movement of the right shoulder and she was able to lift bags of potting mix in her farm. At the 10 month follow up, ultrasound (GE Logic 9, 9MHz probe) performed by the author showed a near complete echogenic infilling obliterating the tear defect. The lateral margin of the tear merged with this neotendon tissue with mild medial retraction (Figure 2). She was completely pain free at a follow up 1 year after PRP injection.

Discussion

PRP has gained increasing popularity in orthopaedic and musculoskeletal medicine in the last few years despite the lack of large volume data and high quality studies. Aside from its autologous nature, the rationale for the use of PRP is on the basis of its anti-inflammatory properties². Application of PRP in treating degenerative rotator cuff lesions is made on the basis of its role in the

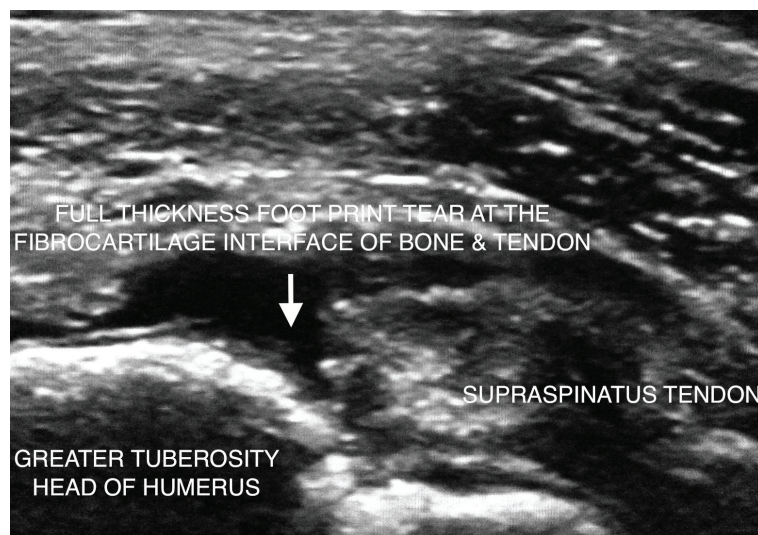


Figure 1. Long axis ultrasound image shows a full thickness footprint supraspinatus tear superimposed on degenerative tendinosis. Tear outline is well appreciated from distension of the peritendinous and subdeltoid bursal space during percutaneous treatment with tenotomy and liquid platelet rich plasma.

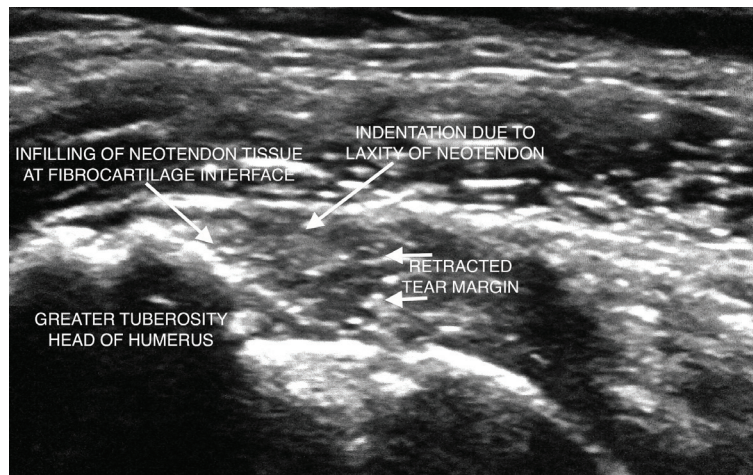


Figure 2. At follow up there is neotendon infilling in place of the tear defect. The lateral tear margin has retracted with mild interval attrition of the supraspinatus tendon. At the time of this follow up study the patient had a dramatic return to a completely pain free state and had full range of movement with no dysfunction.

regulation of matrix gene expression and cell proliferation³. PRP has also shown regenerative effects in an animal model of meniscal fibrocartilage tears⁴ and this supports the use of PRP at the footprint of the supraspinatus insertion where there is fibrocartilagenous tissue at the bone-tendon interface.

This report documents imaging evidence of the formation of neotendon tissue in a patient who experienced complete resolution of symptoms from a full thickness partial width supraspinatus footprint tear. Symptom resolution at the time of manuscript preparation has lasted for 12 months post PRP injection. The precise histology of the neotendon infilling is of uncertain nature, although it is possible that this is fibrovascular tissue⁵. Fibrovascular tissue scars at the bone-tendon interface are prone to failure and it remains to be seen if this patient's relief persists in the long term. The favourable outcome cannot be entirely attributed to PRP. The possible influences of the percutaneous tenotomy, placebo effect, diet, and physiotherapy have to be taken into account. This report serves as anecdotal evidence that PRP does offer an alternative treatment option in some cases of full thickness rotator cuff tears.

Recent papers have contradicted the positive effect of PRP in rotator cuff tears. Two randomized controlled trials with 79 patients and another with 88 patients comparing PRP fibrin matrix (PRFM) versus control on rotator cuff tendon healing showed no demonstrable differences on tendon healing and clinical rating scales^{1,6}. Bergeson *et al.* also showed similar results with PRFM in at risk rotator cuff tears⁷. These studies used a semisolid implant material that had to be delivered through the arthroscope cannula. This implant was left at the bone tendon interface and may have resulted in a space occupying effect in addition to an unfavourable biological

milieu with increased inflammatory mediators. PRP delivered as a semisolid plug in the form of PRFM through arthroscopic cannula is a different product dissimilar to liquid PRP preparations that are injectable under ultrasound guidance.

Routine or repeated corticosteroid injections into the subacromial bursa are controversial given that corticosteroid has a catabolic effect that may be harmful to already degenerative tendon tears. Repeated cortisone injections are questionable given that studies have documented an increased loss of bone mineral density after corticosteroid injections in postmenopausal women^{8,9} with the potential to increase the risk of fractures in this group of patients. In addition corticosteroid does not have a role in the healing cascade of degenerative tears¹⁰. Although there is no doubt that in some instances corticosteroid injection will be needed due to individual circumstances, the widespread use of this approach deserves a rethink on the merits and disadvantages.

Clearly the routine use of PRP in rotator cuff tears is not recommended for all patients on the basis of this single case report. Until further high quality studies are available, use of PRP in rotator cuff tears may be reserved for recalcitrant pain in individuals with high compliance to post injection rehabilitation and in those where close clinical follow up and documentation of clinical outcome including any adverse events would be possible.

Further studies are urgently needed on the ultrasound guided percutaneous use of liquid PRP in degenerative rotator cuff tears. Questions remain on the role of PRP in rotator cuff tears. Is there a role for liquid PRP injection into cuff tears under imaging guidance prior to rotator cuff surgery? Does ultrasound guided PRP

injection into the rotator cuff prior to surgery improve the outcome of surgical repair in comparison to subacromial subdeltoid bursal corticosteroid injection? Would PRP alone suffice in some patients and preclude the need for surgery thus reducing health-care costs?

As far as the author is aware there is no similar published report. This case report documents that liquid PRP may play a favourable role in the stabilization of a full thickness supraspinatus insertional tear with an excellent clinical outcome and fuels the debate on the evolving role of autologous PRP in rotator cuff tears.

Consent

Written informed consent for publication of clinical details and clinical images was obtained from the patient.

Competing interests

No competing interests were declared.

Grant information

The author(s) declared that no grants were involved in supporting this work.

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[Publisher Full Text](#)

Current Referee Status:

Referee Responses for Version 1



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Approved: 21 March 2014

Referee Report: 21 March 2014

In my opinion the author of this case report describes the results well, although I do agree with **Elizaveta Kon** that also including MRIs would have improved the quality of the paper. The real action of PRP is still under debate, and the scientific community asks for stringent methods and careful evaluations, even for a single case study. I suggest the author increases the number of patients and improves the quality of the results in future studies concerning PRP.

I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Competing Interests: No competing interests were disclosed.



Nicola Maffulli

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Approved with reservations: 27 January 2014

Referee Report: 27 January 2014

This article bears witness to how much we fall in love with novelties, and how much we, as a scientific community, do not know yet about a fashionable autologous blood product.

This case report is now one year old, and the situation in this field remains unchanged: randomised controlled trials show in a fairly unequivocal fashion that PRP use is at best dubious, and nevertheless case series report success.

This should make us think, and use strict stringent scientific methods to plan and evaluate new technologies.

I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Competing Interests: No competing interests were disclosed.



Elizaveta Kon

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Approved: 06 February 2013

Referee Report: 06 February 2013

Literature concerning PRP use in rotator cuff pathology is mainly oriented towards intra-operative use of this biological strategy. However, recently, a double blinded randomized controlled trial on 39 patients has been published ([Rha DW *et al.* \(2012\) Comparison of the therapeutic effects of ultrasound-guided platelet-rich plasma injection and dry needling in rotator cuff disease: a randomized controlled trial](#)). This article is a case report on the same topic, with all the scientific limitations related to the nature of such kind of article. At the present moment, also considering the controversies arisen on PRP application in tendon pathology, we need well designed high quality trials to assess the efficacy of this treatment option.

The article is written in a fair manner without big methodological bias. However method is not only how you did what you did but also what you could have done better. Of course case reports provide poor evidence and it is impossible to rely just on findings from this kind of study. The author of the present study should have used some clinical scores (there are many available for the shoulder) to document outcome over time, MRI pre- and post-treatment should be added to better assess tendon healing and the features of PRP used should be discussed as this is one of the crucial points of current debate on PRP application. These changes could improve the scientific value of this case report, and it is important to be exhaustive when you have a single patient examined.

I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Competing Interests: No competing interests were disclosed.

Article Comments

Comments for Version 1

Author Response

AROCKIA DOSS, IMAGE GUIDED THERAPY CLINIC, Australia

Posted: 27 Jan 2014

At further follow up, a year since publication of this paper, this elderly female patient is completely symptom free after PRP to the full thickness supraspinatus tear. In other words this patient is asymptomatic for 2 years. She continues to lift heavy potting mix bags in her kitchen garden and perform all duties without disability.

Anecdotal case reports such as this form the basis of many a Level 1 Randomized Controlled Trial that can prove or disprove the placebo effect. It is incumbent upon those in research departments with adequate funding to perform such trials.

The paper is a clinical report and not a scientific study. I have declared in the paper that this is only a case report and further studies are needed to further ascertain effectiveness.

In the mean time, carefully selected patients who suffer recalcitrant symptoms, should not be subject to repeated corticosteroid injections alone. Those who are not suitable for existing options should be provided the newer option of percutaneous out patient ultrasound guided PRP of the rotator cuff on the basis of its less invasive nature and cost effectiveness.

Competing Interests: I am the publishing author of this paper.
